Problem 1. From the text:
CLR, Page 614, Exercise 27.4-3.

Problem 2. From the text:
CLR, Page 625, Problem 27-1.

Problem 3. From the text:
CLR, Page 627, Problem 27-4.

Problem 4. Maximum Flow using a small number of edges:
Prove that the problem of finding a maximum flow in a graph which uses as few edges as possible is NP-complete. Formally, the input is a directed graph $G$ with capacities on the edges, and an integer $K$, and the question is “does there exist a maximum flow $f$ such that at most $K$ edges have $f(e) > 0$?”

Hint: Give a reduction from Vertex Cover.